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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/757,583	01/11/2001	Masahiko Matsudo	33082M065	8388

7590

06/19/2003

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EXAMINER

NGUYEN, KHIEM D

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/757,583

Applicant(s)

MATSUDO ET AL

Examiner

Khiem D Nguyen

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,8,12,15 and 22-27 is/are rejected.
- 7) ☒ Claim(s) 3-7,9-11,13,14 and 16-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Allowable Subject Matter***

The indicated allowability of claims 1-2 are withdrawn in view of the newly discovered reference(s) to Schuegraf et al. (U.S. Pub. 2003/0062566). Rejections based on the newly cited reference(s) follow.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuegraf et al. (U.S. Pub. 2003/0062566).

Schuegraf discloses a method for depositing a tungsten silicide film (FIG. 6, 20b), wherein when a tungsten silicide layer is formed on polysilicon layer (FIG. 6, 18b), a phosphorous atom containing gas is added to a reactive gas at least in the initial stage that wherein tungsten silicide layer is formed (paragraphs [0004] and [0031]).

Schuegraf fails to explicitly disclose the range of the amount of the added phosphorus atom containing gas as recited in present claim 1.

However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal range for the amount of the added phosphorus atom containing gas through routine experimentation and optimization to obtain optimal or desired device performance because the amount of the added

phosphorus atom containing gas is result-effective variables and there is no evidence indicating that the amount of the added phosphorus atom containing gas is critical and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

2. Claims 8, 12, 15 and 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doshi et al. (U.S. Patent 6,277,720) in view of Hashimoto et al. (U.S. Patent 6,251,188).

Doshi et al discloses in figures 1-3k and related text a method for preparing a gate electrode/wiring, which comprises a step of depositing a tungsten silicide layer (3a, 24) on a polysilicon layer (figure 3a, 22); a step of depositing a silicon nitride layer (figure 3a, 26) on said tungsten silicide layer; and a side wall oxidizing step (col. 7, lines 55+) of forming a silicon oxide film (figure 3a, 11) on a side wall of a gate electrode/wiring layer including said polysilicon layer and said tungsten silicide layer.

Doshi teaches depositing a silicon nitride layer on the tungsten silicide layer but fail to teach depositing a silicon layer on the tungsten silicide layer and wherein a short time annealing step carried out between said depositing and oxidizing steps as recited in present claims 8, 12 and 15.

Hashimoto teaches depositing a silicon layer on the surface of the tungsten silicide layer and wherein the step of forming the tungsten silicide layer is carried out for a short time (about 60 seconds) while substantially maintaining the temperature at about 600 to 700° C (See col. 12, lines 13-32). It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate Hashimoto's teaching into Doshi's method because in doing so the deposited silicon permits moderating the stress within the tungsten silicide layer so as to improve the bonding strength between the polysilicon layer and the tungsten silicide layer (See col. 12, lines 26-29).

***Allowable Subject Matter***

Claims 3-7, 9-11, 13-14 and 16-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.

June 16, 2003



Olrik Chaudhuri  
Supervisory Patent Examiner  
Technology Center 2800